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## The beautiful skull and Blumenbach's errors

**Raj Bhopal** reappraises Blumenbach, an important contributor to the scientific concept of race

**T**he biological concept of human races, as subspecies characterised primarily by physique, has a stormy history.<sup>1</sup> The consensus after the Second World War—that race is a social construct with minor biological components—is now under academic scrutiny, as illustrated by three advances in biomedical science. Firstly, the mapping of the human genome is enabling the importance of genetics in creating and perpetuating differences between populations to be analysed thoroughly.<sup>2</sup> Secondly, personalised medicine has been rejuvenated by pharmacogenomics, which is finding racial classification, for all its weaknesses, a convenient though crude route to understanding differences in drug response. Thirdly, in 2005, the Food and Drug Administration of the United States licensed the drug BiDil (a combination of hydralazine and isosorbide dinitrate) exclusively for the (self defined) black population.<sup>3</sup>

Meanwhile, in support of race as a social construct, and to counter racism, race equality has been enshrined in international and national laws and in governmental and institutional policies.

Race, and the related and newer concept of ethnicity (subgrouping human populations using cultural and physical features, thereby subsuming race), are prominent in modern multi-ethnic societies.<sup>1</sup> Race and racism are topical subjects in the United Kingdom because of the 200th anniversary of the UK's 1807 Abolition of the Slave Trade Act. It is therefore a good time to re-examine the role of perhaps the most important contributor to the scientific concept of race, Blumenbach, whose insights and errors provide important lessons for us today.<sup>4</sup>

### A scientist and humanitarian

For this article, I draw largely on Blumenbach's collected treatises,<sup>4</sup> edited by Thomas Bendyshe. This book includes two memoirs on Blumenbach, one by Professor K F H Marx and the other by M Flourens; the first and third editions of Blumenbach's MD thesis; some other works by Blumenbach; and an essay by Dr John Hunter also on the varieties of humans published in 1775.

Marx's introduction states that in Blumenbach's time "negroes and savages" were considered half animal, and the idea of emancipating slaves was alien. While this was an exaggeration, as the emancipation movement was already gathering momentum, it does reflect the ethos of those times. Blumenbach proclaimed, unequivocally, that such people were only separated from other humans by opportunity. This contribution alone is notable. Blumenbach was revered for his humanity and his science, as indicated not only by the two memoirs in Bendyshe's volume, but also other sources.

Blumenbach's thesis was published in three editions. In 1775 the first edition discussed four geographically defined varieties of humans, while the second edition in 1881 outlined five geographically defined varieties. He developed this classification further in the third edition, which is the definitive volume, where he provided generic rather than geographical labels.

### On the natural varieties of mankind (1775)

The first edition starts with the potential of crossing between species and mentions humans mating with animals. Blumenbach found no evidence for this. He concluded that humans are a unique

species, with no intermediate forms that are partly non-human. He identified the major unique features of humans as the large brain, speech, erect posture, two free hands, naked skin, and the hymen in women (and possibly menstruation).

Blumenbach's central question, one of great interest at the time and still rarely discussed in science, was whether contemporary humans comprised one or more species.<sup>4</sup> Plurality of human species (polygeny) was the popular view in the 18th century. Blumenbach emphasised the unity of humanity, however. He saw gradations among humans, but no distinct species or subspecies. None the less, in the first edition he ventured to describe—cautiously and somewhat reluctantly—four varieties of humans relating to four geographical regions (box). In the second edition in 1781 (also appearing in a footnote in a reprinting of the first edition he identified five varieties of humans relating to five geographical regions (box).

Blumenbach attributed differences between these human types—such as variations in stature and colour—largely to climate. He dismissed leucoplakia, a condition characterised by loss of skin pigmentation, as merely a disease and not even a variety of humanity, never mind a subspecies, as Blumenbach interpreted others' work. He noted that many plants and animals in northern latitudes are white, especially in winter, and also that humans are all born red. Colour, he said, cannot constitute a species or a variety. He attributed the shape of the skull to environmental factors, an observation that threatened the foundations of craniology but was not properly heeded by craniologists (and possibly by himself). He identified the important role that culture plays in changing the body.

### Five varieties of humans (1795)

The third edition starts with a letter from Blumenbach to Sir Joseph Banks, which clarified the notion that humans have their own order of mammalia, gave credit to Linnaeus for being the first to arrange mankind in certain varieties, and making the argument for fresh thinking on this issue.<sup>4 5</sup> He also lists his scientific methods, which include examining skulls, fetuses, hair, anatomical preparations, and pictures and drawings.

#### Blumenbach's human varieties

First edition of his MD thesis: four varieties according to geography (1775)

- People from Europe
- People from Asia to the Ganges and some parts of North America
- People from Africa
- People from North America

Second edition: five varieties according to geography (1781)

- People from Europe (primeval) including north India, North Africa, North America (for example, Esquimaux)
- People from the rest of Asia, beyond the Ganges river
- People from Africa (except the north)
- People from the rest of America
- People from the southern world (such as the Philippines)

Third edition: five generic varieties (1795)

- Caucasians
- Mongolians
- Ethiopians
- Americans
- Malays



Blumenbach thought the skull of a Georgian female (middle, top and bottom) was the fairest of them all

He is more systematic than in the first edition; for example, the differences between humans and animals are listed as erect position, broad flat pelvis, two hands, and regular close set rows of teeth. He emphasises that no clear cut subdivisions of human species exist, but that the “varieties . . . run into one another by insensible degrees.” None the less, he now discerns five varieties—and these labels have stuck to this day (box). The conceptual underpinning of Blumenbach’s classification is largely forgotten and misrepresented, while his classification is mentioned by most people reviewing the topic of race.

He gave examples of people fitting his five varieties. He stated that Turkish and Hindostan women were Caucasians but that people from Bengal and Esquimaux people were Mongolians. He identified New Zealanders (Maoris) as Malays. He thought that Egyptians could be Ethiopian, Indian, or a type with “short chin and prominent eyes.” He was surprised that other people attributed Egyptians to one type. Blumenbach recognised the heterogeneity within populations in one land or nation, something that was overlooked in his time, as it often is now.

### Skulls and blunders

Blumenbach put special emphasis on the study of skulls and he reduced a diversity of skulls to five main varieties. The two key plates are reproduced in the figure (plates III and IV in the treatise). Surprisingly, although he had noted that environment influenced skull shape, he drew major and firm conclusions from his skulls. He wrote, “The meaning and use of this will easily be seen by an examination of plate III, which represents, by way of specimen, three skulls disposed in the order mentioned.

The middle one (2) is a very symmetrical and beautiful one of a Georgian female; on either side are two skulls differing from it in the most opposite way. The one elongated in front, and as it were keeled, is that of an Ethiopian female of Guinea (3); the other dilated outwardly toward the sides, and as it were flattened, is that of a Reindeer Tungus (2). In the first, the margin of the orbits, the beautifully narrowed malar bones, and the mandibles themselves under the bones, are concealed by the periphery of the moderately expanded forehead; in the second, the maxillary bones are compressed laterally, and project; and in the third, the malar bones, placed in nearly the same horizontal plane with the little bones of the nose and the glabella, project enormously, and rise on each side.”

Mostly, Blumenbach’s writing retained a scientific stance, but he exposed his bias on beauty when he wrote that the Caucasian skull of a Georgian female was the “most handsome and becoming.” He stated that the most beautiful people live in the Southern slope of Mount Caucasus—that is, the Georgian people. He then speculated on the origins of humans and made his second error, by going beyond the available evidence. White, to quote Blumenbach, “we may fairly assume to have been the primitive colour of mankind.” His reasoning was that it is easy to change from white to brown but not vice versa. Time has shown that this view was wrong.

These errors were not the result of colour prejudice. Blumenbach refuted the notion that Ethiopians were inferior to other races. Blumenbach wrote favourably about “negroes,” extolling their beauty, mental abilities, and achievements in literature and other fields. He pointed to variations in opportunity as the cause

of differences. His viewpoint on Africans was out of tune with that of the times<sup>6</sup> and more in line with that seen during the movements for civil rights and equality in the 1960s.

### Blumenbach’s legacy

Blumenbach wrote, in a pleased tone, that he had made no striking new discovery but had reached a satisfactory conclusion that all humans are one species. His view on the unity of humanity (monogeny) was a timely correction of the erroneous movement claiming that humans comprised several species.<sup>6</sup>

Blumenbach’s work was a turning point in the history of race and science, although it was nearly 200 years before the lessons were properly absorbed. Blumenbach’s legacy is tarnished by biases and errors, and it teaches us that even great scientists can be led astray by personal views (such as notions about beauty) shaped by the ethos of their times. His original words also show how the simple, clear cut classification of five distinct human races displaced—against Blumenbach’s repeated warnings—the complex reality of gradations and the unity of humanity (including equal potential). Blumenbach’s name has been associated with scientific racism, but his arguments actually undermined racism. Blumenbach could not have foreseen the coming abuse of his ideas and classification in the 19th and (first half of the) 20th centuries.

We continue to struggle with the complexity of the concepts of race and ethnicity, and the resultant imperfect classifications.<sup>1</sup> Now Blumenbach’s varieties of humanity can be seen in virtually every major city, and through the visual media, globally. Blumenbach’s thinking, despite its faults, continues to be relevant, inspiring, and illuminating.

Raj Bhopal is Bruce and John Usher professor of public health at the university of Edinburgh (Raj.bhopal@ed.ac.uk).

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A biography of Blumenbach is in the version on bmj.com

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# PUBLIC HEALTH ACTIVISM

Past campaigns can inspire future strategies, says **Virginia Berridge**

In a recent *Guardian* article the journalist John Harris speculated on what could change attitudes to alcohol consumption. His conclusion was pessimistic: "Faced with a titanic alliance of retail giants, brewers and pub chains—not to mention an electorate drinking for Britain—would any government dare make a move?" But governments have taken action on public health matters; the smoking ban is the most recent example of a set of interventions going back to the sanitary improvements of the 19th century. Are there any lessons from the past for current health campaigning? Here I present three models of activism from different historical periods and draw out their implications for future health campaigns.

## The Health of Towns Association

The Health of Towns Association was an early example of a public health pressure group. The association was formed in 1844 in the wake of Edwin Chadwick's seminal *Report on the Sanitary Condition of the Labouring Population* and was a key advocate of environmental public health interventions in Victorian Britain. The association existed only briefly, from 1844 to 1849. Its aim was

to "substitute health for disease, cleanliness for filth, order for disorder, economy for waste, prevention for palliation, justice for charity, enlightened self-interest for ignorant selfishness, and to bring to the poorest and meanest—Air, Water, Light."

Today it is remembered chiefly as the vital pressure group in the campaign to promote sanitary reform in the rapidly growing cities of industrial Britain. Its work was to arrange public meetings and lectures; publish the *Journal of Public Health*; organise regional groups to further its cause; and lobby MPs, doctors, and opinion formers. The campaign culminated in the legislative milestone, the Public Health Act of 1848, after which the association was dissolved. However, historians have grown more sceptical of heroic narratives of sanitary progress, and they are now more critical of the association's moralistic tone and more conscious of the class and financial interests that it represented in its crusade for reform. The pre-eminent historian of British 19th century public health Chris Hamlin has pointed out that the association kept to the Chadwickian party line, that the problem was sewers and not deprivation.

But the association helped Chadwick to achieve his aims in the 1848 Public Health Act. It was an early example of investigation and activism, of science and political action. It was short lived and was using the wrong science (miasmatic theories of disease), but it did have impact, at a time when the public was suspicious of central government intervention.

## The temperance movement

The temperance movement was a very different 19th century campaigning organisation. It is often equated these days with the prohibition of drink. Even in its heyday, however, it was never a monolithic movement. Initially temperance meant simply being opposed to spirits. The early supporters were from the aristocracy and the middle class. They opposed the drinking of spirits but not of beer. Temperance later meant total abstinence, and most of its support then came from working class interests.

At a temperance meeting on 1 September 1832, seven men from Preston took the abstinence pledge as an experiment for a year. The temperance movement thus concentrated on "moral suasion," on the development of a mass movement that would lead working men to stop going to the pub and to take the pledge not to drink. As the historian Brian Harrison has written, "Teetotalism . . . flourished on the genuine desire for respectability and self-reliance which prevailed within the working class." Moral suasion concentrated on reformation of the individual rather than on state intervention. Temperance advocates acted as missionaries for the cause, and a temperance culture emerged.

For those who joined the movement there was a set of organisations inculcating sobriety and abstinence that in turn influenced a wider number in the general population. Although by the 1860s there were well under 100 000 temperance campaigners, their efforts led to at least a million other adults becoming teetotal and probably many others reducing their alcohol intake. In addition, several hundred thousand child teetotalers were part of the Band of Hope. The temperance movement was also known for its cross class support. Non-conformist business men—and Quakers in particular—who had supported the earlier movement opposing spirits could see the value of a disciplined and sober work force.

The temperance movement prompted debates about public health strategy. The potential of political alliances came to the fore. By the end of the 19th century, the forces for and against alcohol were firmly corralled into two opposing camps—the brewers with the Conservative Party and the temperance movement with the Liberals. But there were also debates about wider strategy. Was it better to go for the "local option"—the possibility of local prohibition (on the model of the United Kingdom Alliance)? Or should there be cooperation with the drinks trade licensing reform, the reduction of licences, and the improved public house?

These debates split the temperance movement before the first world war, and the





The Blue Ribbon Army's Pledge for Temperance

movement did not capitalise on the wartime restrictions on alcohol introduced by the wartime Central Control Board. These restrictions were the equivalent of the current Alcohol Harm Reduction strategy and its recent revision: this is one of the few policy documents since the first world war to take an overall view of alcohol policy. The temperance movement had a huge impact in terms of culture in the 19th century, but its long term role in policy was limited—in part, some historians have argued, because of its failure to make strategic alliances, including capitalising on the possibilities of action with the drinks industry.

### Smoking and public health pressure groups since the 1970s

The public health pressure groups that have emerged since the 1970s to campaign on life-style matters such as diet, smoking, and heart disease present a different model of activist organisation. ASH (Action on Smoking and Health), set up in 1971 after the second report on smoking by the Royal College of Physicians,<sup>10</sup> is a key example here. ASH was not a mass movement like the temperance movement; rather it focused on using the media. In doing that, the role of science was of central importance.

Although the organisation was founded by doctors, including the charismatic and media conscious Charles Fletcher, the involvement of non-medics and radical activists made a difference.<sup>11</sup> The arrival of the activist Mike Daube as director of ASH in the 1970s brought this new emphasis and style to the organisation. Daube had a campaigning stance derived from his previous work at the housing charity Shelter, which had pioneered a media and publicity conscious approach to social issues. He was strongly influenced by this new style

of campaigning introduced by the director of Shelter, Des Wilson. Daube also had a background in student politics.

In an interview he gave to an Australian journalist in the mid-1970s, Daube showed his media style: "It seemed to me when I came into ASH that here was a pressure campaign that was ripe. It hadn't been properly used. You had your villain. You had your St George and the dragon scenario, you had

your growing ecology bandwagon, growing interest in consumerism. It seemed there were a lot of prospects of making something out of it."<sup>12</sup> Daube was expert at working up the issue in the media with eye catching stunts and spin.

The arrival of such intensely media conscious campaigners brought the possibility of wider alliances for medicine and public health interests. In the 1970s an alliance developed between ASH and the central health education agency, the Health Education Council. In the 1980s this alliance widened into a network of organisations in which the BMA was important. Subsequently these networks developed an international dimension: the organisation directed its activism at securing the recent Tobacco Framework Convention<sup>13</sup> (which provides a mechanism for tobacco control measures worldwide) and at tobacco use in the Far East and in developing and eastern European countries.



Other health concerns show a similar pattern. For example, the initial media focus of the gay men who refounded the Terrence Higgins Trust in 1983 (after its initial foundation in 1982 under a different name and with a different function), the subsequent development of gay networks, and then international action.<sup>14</sup> The harm reduction emphasis in drug policy has followed a similar route, with networks of organisations being developed at the national level and then an international network developed through the International Harm Reduction Association ([www.ihra.net/HistoryandFounders](http://www.ihra.net/HistoryandFounders)), which now lobbies through the United Nations machinery of drug control.

### Conclusions

These case studies help in designing strategies for current health campaigns. They show the importance of the role of science in communication: this was a key campaigning tactic in the 1840s and in the 1970s. Not all scientists have agreed with this role. In the 1950s, Austin Bradford Hill and Richard Doll, who discovered the relation between smoking and lung cancer, were averse to promoting these scientific results in policy making circles—Hill in particular thought that drawing policy implications from science was a job not for scientists but for policy makers.<sup>14</sup> And the presentation of science has also changed—from the tracts of the 1840s to media spin on science. The media has become a crucial interface for public health campaigning: having a clear media message from science is important.

Dilemmas such as whether to cooperate with industrial interests are also still relevant today. The temperance movement was criticised for not capitalising on harm reduction tactics with industry and on losing influence as a result. Some of the early smoking campaigners did work with industry. Later on, largely as a result of ASH's influence, a resolutely hostile attitude developed. Now attitudes to industry vary. In the smoking field there is hostility to tobacco interests but more dialogue with the pharmaceutical industry because of nicotine products. For alcohol, the dilemma over industry links is still contentious for some public health scientists and campaigners. Whether to work with industry is clearly a decision that depends on the prevailing conditions at the time.

In recent times, networks of health organisations and pressure groups have been important as they have first established the area of concern at the national (and sometimes local) level and then developed it internationally. In the 19th century, the movements against



alcohol and opium also had a strong international dimension, which smoking campaigners have adopted in recent times.

Making use of politics is important but time dependent. Political divisions initially aided the temperance movement in the late 19th century because they gave momentum to the debate on alcohol. Later, though, the political connection of Liberalism with forces opposed to alcohol became seen as “old fashioned” as the alcohol debate waned. Seizing the moment is clearly important, as is using the possibilities of the political system. In the 1970s ASH obtained most of its funding from government, an early example of state funded voluntarism. Health pressure groups became useful at that stage to government, which could use them as a counterweight to pressure from elsewhere in the system. In the 1980s, smoking campaign tactics focused more on networks of organisations as the government became generally more sympathetic to the tobacco industry and less inclined to seek a non-governmental activist ally.

So the past is instructive. The current emergent health campaigns of today (such as that on alcohol) need to promote their case through the media but with scientific clarity; organisations need to work in a network of strategic alliances; timely consideration of the politics of the issue is important; and

campaigners need to consider whether to work with industry. Such activities also have a wider dimension. Historically, they have helped to achieve political and policy change, but they have acted also in a more intangible way as engines of cultural change, helping to create a new climate of opinion. And without cultural change, few governments would consider political change, in particular where substance misuse and public health are concerned. Conservative and Labour governments in the 1950s and '60s were far more concerned about electoral opposition to smoking restrictions than about the views of the tobacco industry. So activism has a dual and interconnected rationale—pushing for policy change but also helping to achieve cultural change. That change is a long process, as the history of smoking tells us.

Virginia Berridge is a professor of history at the Centre for History in Public Health, London School of Hygiene and Tropical Medicine, London WC1E 7HT  
virginia.berridge@lshtm.ac.uk

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## London's last remaining Georgian workhouse infirmary under threat

From 1601 until the start of the NHS in 1948, provision of hospital care for the most destitute was a local responsibility. Initially, under the Elizabethan poor law, parishes provided workhouses, which often included some rudimentary infirmary, though little recognisable health care. The oldest one that survives in London was built in 1775-8 in Cleveland Street, Fitzrovia, by the parish of St Paul's, Covent Garden. The elegant H-shaped, four storey, Georgian building originally had a stone relief over the entrance depicting an old man pointing to the motto Avoid idleness and intemperance. With the merger with six other parishes to create the Strand Poor

Law Union in 1836, its role as an infirmary was formally recognised. After construction of two additional lateral blocks, it housed more than 550 people in 330 beds. Like all workhouse infirmaries, it provided half as much space per person as that designated for prisons. Longstanding concern about the care provided in such establishments culminated in two national inquiries in the 1860s.

The Cleveland Street infirmary was notable for the contribution some of its staff played in the national campaign for reform, most notably Matilda Beeton, a nurse, and Joseph Rogers, who not only served as doctor for 20 years but also helped found the Association for Improvement of Workhouse Infirmaries and became president of the Poor Law Medical Officers' Association.

Reforms arrived in 1867 with the establishment of the Metropolitan Asylums Board, the first opportunity for London-wide planning of health services. The building served as an infirmary for the newly created Central London Sick Asylum District, which extended from Westminster to Bloomsbury, until 1927 when alternative provision meant it was no longer required. However, it continued as the outpatient department for its long-time neighbour, the Middlesex Hospital, until the recent move of all services to the new, state-of-the-art University College Hospital.

While welcoming the move, we should also be preserving this building, the only remaining example of a hospital that served the poor of London for 150 years.

Nick Black is professor of health services research at London School of Hygiene and Tropical Medicine, London ([nick.black@lshtm.ac.uk](mailto:nick.black@lshtm.ac.uk))



# Enduring beliefs about effects of gassing in war: qualitative study

Edgar Jones,<sup>1</sup> Ian Palmer,<sup>2</sup> Simon Wessely<sup>1</sup>

<sup>1</sup>Institute of Psychiatry and King's Centre for Military Health Research, Weston Education Centre, London SE5 9RJ

<sup>2</sup>Medical Assessment Programme, St Thomas' Hospital, London SE17EH

Correspondence to: E Jones  
edgar.jones@iop.kcl.ac.uk

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## ABSTRACT

**Objectives** To discover the content of enduring beliefs held by first world war veterans about their experience of having been gassed.

**Design** Collection and thematic analysis of written and reported statements from a sample of veterans about gassing.

**Subjects** 103 veterans with a war pension.

**Results** Twelve themes were identified, which were related to individual statements. The systemic nature of chemical weapons played a key part in ideas and beliefs about their capacity to cause enduring harm to health. Unlike shrapnel or a bullet that had a defined physical presence, gas had unseen effects within the body, while its capacity to cause damage was apparent from vesicant effects to skin and eyes. The terror inspired by chemical weapons also served to maintain memories of being gassed, while anti-gas measures were themselves disconcerting or a source of discomfort.

**Conclusions** Chronic symptoms and work difficulties maintained beliefs about the potency of chemical weapons. In the period after the war, gas continued to inspire popular revulsion and was associated with a sense of unfairness.

## INTRODUCTION

The use of gas has been described as an "atrocious method of warfare"<sup>1</sup> and has had long term consequences on exposed servicemen. Recent studies of troops in training or civilians attacked by terrorists have shown that chemical weapons have retained their capacity to frighten. Although realistic exercises

may do much to encourage habituation, for some such drills are in themselves traumatic. Three studies of US troops on courses on chemical and biological weapons found that 10-20% experienced moderate to severe psychological symptoms.<sup>2</sup> Because civilians often share the fears of their military counterparts, chemical weapons appeal to terrorists and others engaged in asymmetric warfare.<sup>3</sup> The release of a small quantity of sarin gas in the Tokyo subway system in 1995 by a terrorist organisation killed 12 people but led to the emergency rooms of local hospitals being swamped by over 5500 people, of whom fewer than 20% were deemed to have experienced any identifiable physical effect.<sup>4</sup>

During the first world war, fears associated with chemical weapons were disproportionate to their killing power. Augustin Prentiss of the American Chemical Warfare Service estimated that only 4.3% of US gas casualties died compared with 24% of other types of battlefield injury.<sup>5</sup> While there are few long term studies of the physical effects of gas, those that exist suggest that their capacity to cause harm may have been overstated.<sup>6</sup> In the US, a major government funded study examined 838 servicemen exposed to chlorine and 1016 exposed to mustard gas and concluded that gassed veterans were at an increased risk of chronic bronchitis, though they were unable to control for confounders such as smoking, industrial pollution, and poor quality living conditions.<sup>7</sup> An investigation of 111 UK veterans who had volunteered to take part in chemical agent trials at Porton Down in the 1950s found no evidence of any long term adverse effects on health or unusual patterns of disease.<sup>8</sup>

Using records from the first world war we explored the ideas and beliefs held by servicemen exposed to gas but not seriously incapacitated.

## METHOD

The 7800 first world war files held by the War Pensions Agency provided a sample of veterans who had been exposed to gas. The records relate to all diagnoses. While not necessarily representative of all gassed people, the records provided an extended period of assessment and included death certificates. Regular medical boards held over periods of up to 60 years enabled us to gather a wide range of statements about perceptions of gas and its effects. We extracted a random sample of 103 files.

We excluded veterans with severe respiratory illness to focus on those whose ideas and beliefs were not grounded in objective pathology. We included pensioners who had occasional or mild episodes of



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This is an abridged version of an article that was published on bmj.com



IMPERIAL WAR MUSEUM/ART ARCHIVE

### What happened next?

bronchitis. Data on mortality confirmed the essential healthiness of the sample as they had a mean age of 82 (range 54-102).

When applying for a pension or presenting to a medical board, veterans were examined by a panel of civilian doctors. Veterans referred for a specialist opinion had an opportunity to say what they believed was wrong with them. Statements survived for 60 subjects; no reports could be found for 43. Most of these accounts (61%) relate to the period November 1918 to December 1924, and 95% were reported between the end of the war and June 1949. We collected data as free text, which was analysed thematically by using the constant comparative method.<sup>9</sup> Claims were verified by reference to military medical cards and hospital records.

### RESULTS

We identified 228 statements from the 60 veterans for whom we had data. The length and number of their statements varied; some wrote lengthy documents while others submitted single line responses.

Three themes were repeatedly expressed by different individuals or by the same person on several occasions: that the person had an enduring illness (expressed by 58% of those who recorded statements), that continuing ill health had been caused by gas (55%), and that effects of gas poisoning were so severe as to lead to a considerable loss of time from work (57%). Allied to these core themes were three associated beliefs: that chest and lungs had been damaged (38%), that their health was deteriorating (32%), and that a medical intervention was needed (20%).

These themes can be illustrated by the following statements: "I have been getting gradually worse every year . . . Also that my system is full of gas" (March 1930). "I have now come to the conclusion that instead of the effects of gas wearing off as hoped, it has gradually overpowered me" (January 1927). "I honestly feel done up and not half the man I should be . . . I have to lose time at work" (May 1923). "I am often ill and cannot always get my breath, and am sure it is by being gassed" (April 1924). The potency of gas was also revealed: "a stuffy feeling in the chest and a feeling of suffocation" (May 1926), "have suffered from loss of voice on several occasions, which I am of the opinion was caused by being

gassed on active service" (March 1924).

Associated with these themes were beliefs that the person needed to breathe fresh air as much as possible (four cases) and could undertake only light manual labour (eight cases). Surprisingly, the psychological consequences of being gassed were scarcely mentioned, "nerves" and depression being recorded by only three veterans. That these were genuine beliefs is supported by consistency of reporting.

In general, this group of veterans believed that the effects of chemical weapons were irreversible, potent, and debilitating. These conceptions stood in contrast with the objective measures of health recorded for individuals in the sample.

### DISCUSSION

#### Traumatic memory

The statements themselves offer clues as to why gas was so frightening and had such a lasting effect on men's minds. Unlike a bullet or piece of shrapnel, which could lodge in the body and be removed surgically, gas was systemic. A toxin could be drawn deep into the lungs and spread through the viscera, akin to a pathogen from a plague.<sup>10</sup> The visible damage caused by mustard gas to the skin and eyes offered tangible evidence of what a poison could do inside the body. The chemical agent had no definite physical limits and no operation could remove it.

During the war itself, gas was one of the most feared weapons. It inspired emotion out of all proportion to its ability to kill or wound. In part, this related to surprise deliberately exploited by combatants. With the introduction of the gas shell in February 1916, a toxin could be delivered anywhere within artillery range. Habituation and the adoption of coping strategies were hampered by continual refinements in chemical weapon technology. Knowledge, even among the medical corps, remained perfunctory.

Some anti-gas devices, in particular the respirator, led to limited vision and made breathing a conscious effort.<sup>11</sup>

#### Beliefs and symptoms

Recent studies of US veterans exposed to the threat of chemical weapons have shown that both symptoms



### WHAT IS ALREADY KNOWN ON THIS TOPIC

Chemical weapons exercise considerable psychological effects beyond their capacity to kill and wound. Those exposed to chemical weapons, or even the threat of them, often experience chronic adverse health effects.

### WHAT THIS STUDY ADDS

The systemic nature of chemical weapons plays a crucial part in establishing ideas about their potency and long term consequences.

The powerful emotions attached to the exposure itself inspire strong beliefs that frame interpretations of subsequent ill health.

and the memory of alerts in war zones are important in establishing and maintaining beliefs about being poisoned. In 2006, it was reported that 64% of a sample of 335 US veterans of the Gulf war believed that they had been subjected to chemical weapons compared with 6% of 269 service controls who had not deployed to the conflict.<sup>12</sup>

All of the veterans in our study experienced enduring symptoms.<sup>13</sup> These were in general somatic and mostly focused on the respiratory and cardiovascular systems. Acute respiratory infection immediately after the war tended to be framed in terms of exposure to gas and regarded as further evidence of its long term effects.

### CONCLUSIONS

We conclude that there was an interaction between ex-servicemen's symptoms and beliefs, which began with the traumatic experience of being gassed but was also linked to popular convictions about its potency and systemic effects. The conviction of

having been gassed had long term deleterious effects on a person's beliefs about illness and perceptions of health and wellbeing. Our analysis might assist in understanding the otherwise baffling persistence of ill health experienced by some US and UK military personnel after their deployment to the 1991 Gulf war.

**Contributors:** See bmj.com.

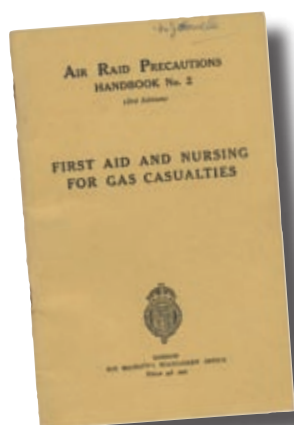
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## Observe cases minutely, improve in my profession, write to the "Lancet"

So wrote Arthur Conan Doyle to his mother on qualifying in medicine from the University of Edinburgh in 1881. But the creator of Sherlock Holmes had already published a letter in the *BMJ* while a medical student.<sup>1</sup>

In his third year, he worked as a dispensing assistant to Reginald Hoare, a general practitioner in Aston. Conan Doyle had developed symptoms of persistent neuralgia and taken tincture of *Gelsemium sempervirens*, the dried rhizome and root of yellow jasmine. Its effects resemble those of nicotine, but with stronger depression of the central nervous system.

He increased the dose incrementally from 40 minims (2 ml) on the first day to 200 minims (10 ml) by the seventh. Conan Doyle reported his resulting symptoms; initial "giddiness," difficult eye accommodation, headaches, and diarrhoea with severe depression on the final day. Although his *BMJ* letter describes the drug's side effects, he must have known that deaths from respiratory arrest had been reported with *Gelsemium*.

Self experimentation reappears in his MD thesis on vasomotor changes in *tabes dorsalis*.<sup>2</sup> Conan Doyle described experimenting with nitroglycerine as a vasodilator before using it on his first patient. "The dose beginning with one drop may be safely increased to twenty, a congestive headache being the first sign of overdose. I have myself taken as many as forty minims without inconvenience."

Conan Doyle wasn't the only self experimenting doctor in the 19th

century. In the 1880s Sigmund Freud brought the effects of cocaine to the attention of the medical world but not before sampling them himself: "In my last severe depression I took 'coca' again and a small dose lifted me to the heights," he wrote to his fiancée.<sup>3</sup>

Freud abandoned his interest in cocaine just as his colleague Karl Koller began experimenting with its use as an anaesthetic in eye surgery. Conan Doyle visited the ophthalmology department at Vienna Hospital in 1891 and became aware of the toxicity of cocaine.

But what of the fictional Sherlock Holmes, who became addicted to cocaine? Did his addiction begin in the same spirit of self experimentation shown by his creator's explorations of *Gelsemium* and nitroglycerine? In the *Sign of Four*, Dr Watson admonishes Holmes for his cocaine addiction: "Count the cost! It is a pathological and morbid process, which involves increased tissue change and may at least leave a permanent weakness."

**Frank Rugman** consultant haematologist, Lancashire Teaching Hospitals NHS Trust, Preston PR2 9HT  
frank.rugman@blueyonder.co.uk

**Competing interests:** None declared.

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# VISITING TIMES

**Sadia Ismail** and **Graham Mulley** discuss the evolution of rules about visiting patients in hospital

From 2 pm they gather at the entrance to the ward, occasionally drifting through the doors, only to be reminded by sister that “visiting starts at 2.30 pm.” Doctors cower in the office, completing paperwork and dreading that journey to the bedside for a drug card, fearing they may pay the price with a long tirade from a patient’s relative. Nurses rush from one patient to another, trying in vain to complete the afternoon drug round. An eager student nurse rings the bell to indicate end of visiting, causing a collective sigh of relief.

Many health professionals will recognise this scene. Visiting sick people in hospital has always been comforting to patients and reassuring for visitors, but restrictions have been the subject of emotive debate (newspaper cutting). Over the past three centuries patterns of limitations on visiting have varied widely, from open policies to more restricted ones. We have used various terms to describe these restrictions (see box).

Patient choice is increasingly a driver for improvements in the National Health Service and is specified by the Department of Health as a priority. Making patients partners in decisions on visiting can, however, lead to conflict when relatives want unrestricted visiting but managers and clinicians prefer limitations because of concerns about disrupting clinical care.

We studied published histories of several UK hospitals, which gave us an intriguing sample of visiting policies from the 18th century

## Definitions of visiting types

**Open visiting**—visiting at any time and of any duration (for example, in hospices, intensive care units, paediatric wards)

**Restricted visiting**—visiting bounded by rules on timings, duration, and number of visitors or who can visit

**Flexible visiting**—visiting with some restrictions but which can be altered according to needs, choice, and circumstances of patients and visitors

onwards. We also undertook a literature review to determine why restrictions have changed so much and what may be considered the optimal pattern of visiting.

## Historical context

In the 1700s and 1800s many hospitals had few restrictions on visiting—for example, the Royal Devon and Exeter Hospital had open visiting.<sup>1</sup> In 1767 regulations were introduced at St Bartholomew’s Hospital, allowing visits of up to one hour a day.<sup>2</sup> Leicester Royal Infirmary limited duration of visits to two hours, with special arrangements being made for the visitors of dying patients.<sup>3</sup> Other hospitals were more authoritarian: Doncaster Royal Infirmary allowed visiting three afternoons a week in the 1870s<sup>4</sup> and the Royal Berkshire allowed only 15 minutes twice a week.<sup>5</sup>

## Infections

Visiting times often became restricted because of epidemics of infections. In 1832 many hospitals (including the Royal Devon and Exeter Hospital<sup>1</sup>) closed all wards to visitors during a national cholera epidemic. They reopened to visitors the following

year, four weeks after the last case. Measles and smallpox outbreaks in Doncaster led to the Royal Infirmary closing to visitors in 1883,<sup>4</sup> and a scarlet fever epidemic in 1887 resulted in St Bartholomew’s restricting visiting to one hour a week.<sup>2</sup> In more recent times hospitals have been closed to visitors during the outbreak of severe acute respiratory syndrome.

## Visiting cards

Visiting cards were introduced in Leicester Royal Infirmary in 1787<sup>3</sup> and in St Bartholomew’s Hospital in 1894<sup>2</sup> as a means of restricting numbers of visitors. The card stated the patient’s name, ward, and bed number; it allowed one visitor aged more than 14 years and had to be presented on each visit and returned on the patient’s discharge (figure).

Some hospitals used passes on particular days,<sup>6</sup> some used passes colour coded for the ward,<sup>7</sup> and some even charged nominal fees for visiting. Doncaster Royal Infirmary<sup>4</sup> introduced visiting cards as late as 1924.

## Children

In some hospitals, visiting cards stated that only older children could visit.<sup>2</sup> In 1952 Harefield Hospital did not allow any child visitors<sup>6</sup>—they had to wait in the memorial hall.

Restrictions were supposed to protect the children from stress and the patients from infection—especially in intensive care units. A survey of intensive care units in the United States in 1984 showed that only 11% allowed visits from children, including immediate family.<sup>7</sup> Even on general wards child visitors were discouraged because of concerns about “poorly supervised children” left under the responsibility of nursing staff or patients.<sup>8</sup>

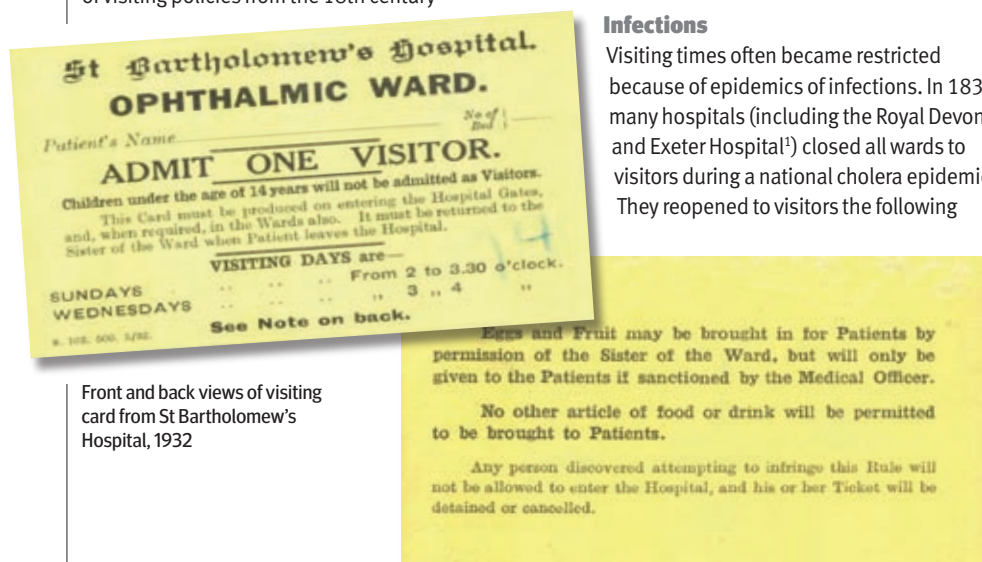
Evidence of the benefit to children of visiting is clear; children who visit critically ill relatives show fewer negative changes in behaviour and emotions and are more prepared for any loss than those who are not allowed visiting.<sup>9</sup> Not visiting also increases the stress and fear of hospitals.

Despite these advantages to the family unit, children still seem to be targeted first in any increased restrictions on visiting. In 2006 an author noted that during a norovirus outbreak rather than banning those with symptoms or a contact history from visiting, children were specifically banned.<sup>10</sup>

## The past 50 years

At the inception of the NHS in 1948, many hospitals had stringent visiting policies,<sup>11</sup> even for younger patients; parents were thought to unsettle their children by visiting them.<sup>12</sup>

The impetus for change was the Platt report in 1959.<sup>13</sup> This outlined the case for open visiting in



Front and back views of visiting card from St Bartholomew’s Hospital, 1932



Visiting hours is an emotive topic (York Press 25 August, 2007)

children's wards to improve the emotional and mental health of the children and to prevent isolation from the family. The attitudes of better informed and more inquisitive parents also influenced visiting policies. With greater emphasis on patient centred care, more open visiting policies again became accepted practice in both adult and children's wards.

Change, however, was slow. An article in the *Nursing Times* in 1970<sup>14</sup> referred to a normal pattern of visiting as one hour on three afternoons a week and 30 minutes on four evenings a week.

In the 1980s and 1990s many hospitals started restricted visiting again. This was in response to nursing staff, concerned that disruption by and demands of visitors could interfere with the running of wards and hamper patient care. Other concerns were about privacy and stress levels of patients and confidentiality during ward rounds.<sup>15</sup>

A letter to the *BMJ* in 1988<sup>15</sup> described open visiting at Arrows Park Hospital as a disaster; "because of abuse of the system by visitors. Many would arrive promptly at 8 am and stay all day. They would bring sandwiches and flasks... and camp out by their relative's bed... Others would eat patients' food, ask for extra cups of tea etc." Visiting was soon restricted to two short periods a day.

Standard restrictions currently include two visitors per patient; having afternoon and early evening visiting only; and not allowing visiting during meal times, ward rounds, or ward cleaning.

## Evidence

The Patients' Charter<sup>16</sup>—produced by the Department of Health to define what patients can expect from the NHS—states that flexible visiting hours improve patients' experience. Many think, however, that this would undermine the

practicalities of running a ward. Often, visiting hours vary between wards in the same hospital and there seems to be little consensus about what is best. A 1988 survey showed significant regional variation in UK visiting policies.<sup>17</sup>

Several studies have focused on visiting in relation to critical and coronary care.<sup>8-10 18-20</sup> Patient centred care is particularly important in these areas, where allowing time for adjustment can improve the emotional health of the whole family.

One research team<sup>18</sup> did a survey of visitor and nursing

satisfaction with an open visiting policy and found the same conflict of patients' care needs compared with patients' and relatives' emotional needs. They found that nursing staff allowed more flexible visiting depending on patient and family needs and circumstances. They suggested this informal arrangement could be formalised by visiting contracts agreed between nursing staff, patients, and the family. These would be clearly documented but would rely on cooperation rather than enforcement.

Another study<sup>9</sup> found that intensive care units restricted visiting either in time, number, or type of visitors. They also suggested that contracts may be the happy medium between rigidly enforced policy and lack of regulation.

A survey in 2005 during an open visiting policy found that patients and visitors appreciated flexibility of hours but preferred a quiet hour with no visiting, and uninterrupted mealtimes.<sup>8</sup> Conversely, most staff preferred set times with little flexibility.

Why do staff members have such different preferences to patients and visitors? This may in part be a result of negative perceptions of visitors and bad experiences.<sup>8</sup> One author<sup>19</sup> stated three concerns of doctors and nurses about open visiting as increased physiological stress, physical and mental exhaustion of the patient, and interference with provision of care. Some of these concerns are unsubstantiated; some evidence suggests that stress, measured by heart rate and blood pressure, is reduced by the presence of close family members.<sup>19</sup>

A recurrent concern is that of infection control. A pilot randomised study showed, however, that despite increased quantities of bacteria in an intensive care unit during open visiting, similar rates of sepsis were found and also a reduction in cardiocirculatory complications.<sup>20</sup> They postulated this may be due to decreased anxiety resulting in favourable hormonal profiles in these patients.

## SUMMARY POINTS

Patterns of limitations on visiting patients have varied over the past 300 years

Patients, relatives, and health professionals have different opinions about who should visit and when

One solution may be visiting contracts that are agreed on admission

## Conclusions

The evolution of visiting hours has fluctuated from open visiting, to restrictions to suit health professionals' priorities, to patient centred and family centred visiting. Many health professionals continue to have concerns about patient stress, risk of infection, and the practicalities of running a ward if visiting is unrestricted.

It seems strange that close family members may be seen as interfering with provision of care. Surely most would understand and encourage the optimum delivery of care? Indeed some would be happy to participate in the nursing and personal care of their relative, including feeding at meal times.

We believe that a shift in culture is needed to ensure the best practice on visiting policies. Any visiting restrictions should be based on mutual respect and consideration. Health professionals should consider the rights, worries, and needs of patients and their families, and visitors need to understand the roles and pressure on staff and the needs of patients other than their own relative. Perhaps patients' control of their visiting hours in the form of a contract may help, and this merits formal study.

A balance needs to be struck between patients' and relatives' emotional needs and the need to carry out clinical duties. It is often during visiting time when staff can connect with patients and their carers. This can lead to new perspectives on a patient's home and social circumstances and greater understanding of the interactions and dynamics of the family. Ultimately, flexibility in visiting hours and mutual understanding will lead to more satisfied visitors.

**Sadia Ismail** Pinderfields General Hospital, Wakefield WF1 4DG  
Correspondence to: S Ismail [sadiaismail@doctors.org](mailto:sadiaismail@doctors.org)  
**Graham Mulley** St James's University Hospital, Leeds  
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# CLIMATE CHANGE—2057

Writing in 2057, the *BMJ*'s Africa correspondent, **Robin Stott**, looks back at the development of the greatest medical advance of the first half of this century

Over 50 years ago, the *BMJ* asked readers to identify the key advances that had improved health since the first edition was produced in 1840. From a shortlist of 15, introduction of sanitation was voted the most important.<sup>1</sup> Today we publish the result of a comparable survey covering the past 50 years. From the 15 shortlisted advances (see box) readers once again put a public health initiative in first place: the role that health professionals played in the campaign to mitigate the ravages of climate change. The *BMJ* was in the forefront of this campaign, described below.

## Information and affirmation

In 2006, there was growing concern from many experts about the problems that global warming posed for health. Recognising the urgency of the situation, health professionals acted decisively, including forming the influential climate and health council.<sup>2</sup>

First we informed. Health professionals articulated the gravity and extent of the problem and emphasised that all consequences would be much worse for the two billion globally disadvantaged people, most of whom lived in the non-industrialised countries. We also offered hope, pointing out what is now clear—that moving to low carbon societies would be health improving for all.

Second we affirmed. As health professionals we were among the first to reduce our

## THE 15 SHORTLISTED ADVANCES

- Action against climate change
- Use of dark energy to correct chromosomal abnormalities
- Thumbnail sized patient record carried in a subcutaneous pocket of the individuals' choosing
- Manipulation of telomeres to ensure healthy old age
- Legislation for end of life decisions
- AIDS vaccine
- In vitro growth of new organs
- Functional MRI enhancement of counselling for depression
- Male contraceptive pill
- Mosquito sterilisation
- Phagocytic stimulation as a substitute for antibiotics
- Walk in diagnostic box giving instantaneous biochemical, haematological, and imaging information
- Apparatus for measuring persistent organic pollutant levels in any material
- Regulan tablets for regulating the amount of energy burned in metabolism
- Remote surgery

individual carbon footprints and to persuade the institutions we worked in to do likewise.

Through this leadership role of information and affirmation, we brought together major health professional institutions, inspired academics, ambassadors, architects, engineers,

lawyers, and teachers to join us, and used our collective advocacy skills to achieve the crucial breakthrough. The adoption of contraction and convergence<sup>3</sup> at the 2009 UNFCCC (United Nation Framework Convention on Climate Change) meeting in Copenhagen, and for which Aubrey Meyer, its author, received the Nobel peace prize in 2013, marked the turning point in the campaign.

## A global framework

By 2006, it was clear to all that resolving the problem of global warming needed a global framework and this required the active participation of all people. Those populations in the disadvantaged world, who had little responsibility for global warming, pointed out that any framework would have to deliver them sufficient resources to get similar development benefits to those that the advantaged world had secured through the burning of fossil fuel. Any viable framework had therefore to cap and reduce global carbon emissions while at the same time ensuring that the most disadvantaged people received resources that would enable their development. Of the various contenders, by far the most feasible framework was contraction and convergence.

Alarmed by the increasing frequency and escalating costs of serious climate related events, and alarm accentuated by the demand for oil outstripping the supply,<sup>4</sup> the contraction component was readily agreed by the communities of the rich world. Contraction entailed setting a global carbon budget and reducing this annually so that atmospheric levels of carbon dioxide didn't exceed 450 ppm, giving us a 50:50 chance of avoiding dangerous climate change. The turbulent political times of the early part of this century, however, meant that getting agreement to convergence was more difficult. Persistent pressure from health professionals on all UN bodies, amplified by the outstanding statesmanship from senior leaders of the Mandela mould, was needed to persuade the global decision makers of the efficacy of convergence.

Convergence entailed giving an equal entitlement of carbon to each of the then four billion adult inhabitants of the world. Disad-



By 2007, doctors realised they had to put their own house in order ...



... and think hard before attending another international meeting

vantaged people, who were almost all low carbon emitters, would have entitlements to sell to the high carbon emitters of the rich north. The market in carbon entitlements would be constrained by the reducing global carbon cap, but within these constraints the disadvantaged, by redeeming their entitlements, would get substantial flows of money. Furthermore, the market signals for all concerned would be toward low carbon investment. There were both philosophical and practical objections raised to this simple and elegant solution. Some pointed to the fact that the entitlement didn't take into account the amount of fossil fuel burned by the rich nations over the preceding two centuries, though they failed to offer a viable framework that did. Others worried about the practicalities of implementation. Advocates of contraction and convergence responded that any global framework would be difficult to implement. Once the principle was accepted, the numerous agencies with experience of working across the globe would find a way, and so it was. Others objected that the level of corruption in disadvantaged countries meant that no market

mechanism could work to the advantage of the poor. Pilot studies in Mozambique, the state of Bihar in India, and Nicaragua refuted this pessimistic view. The unwavering commitment of the professional bodies countered the opposition and, by pointing out the enormous public health benefits of moving toward a more equal low carbon world, won the argument for the convergence component of contraction and convergence.

#### Cycle of virtue

Contraction and convergence created a global virtuous cycle of activity giving environmental, economic, and social benefit, particularly to the poor. This global virtuous cycle unleashed numerous similar cycles at all levels of society, of which the local cooperative production of renewable energy is perhaps the best known. With a reliable energy supply, people became self sufficient in food, creating a secure local economic base. Female literacy reached 95%, family planning became affordable to all who wanted it, and the money flow enabled the realisation of the millennium goals.<sup>5</sup> A proliferation of carbon capture technologies blos-

somed in the north, creating meaningful work and the psychological boost of realising that each locality could be part of the solution. Cuba, which underwent an enforced decarbonisation of its economy in the early 1990s, by 2006 was the only country in the world that had achieved its UN development targets without exceeding its footprint and gave reassuring testimony of the benefits of moving to a fair shares, low carbon society.<sup>6</sup> Thus was set in place the global transformation that we have been privileged to be part of.

As the Africa correspondent of the *BMJ*, I am writing this article today in a Dar es Salaam where local production and consumption cycles contribute to a vibrant social and economic society that flourishes within environmental limits. The infant mortality is 20/1000, fertility rate 2.1, life expectancy 75, there is universal culturally appropriate education, and a female president oversees a parliament with 50% of women members. The major turbulence of the past four decades is behind us. By the foresight and actions of those pioneers 50 years ago what could have been a global health catastrophe has been averted. It is not surprising that our readers have identified the actions to mitigate climate change as the most important medical advance of the past 50 years.

Robin Stott is vice chair Medact, London N1 6HT  
stott@dircon.co.uk

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## Horrible phenomena! Galvanism

On the 4th Nov. last, various galvanic experiments were made on the body of the murderer Clydsdale by Dr. Ure, with a voltaic battery of 270 pairs of 4 inch plates. The results were truly appalling. On moving the rod from the hip to the heel, the knee being previously bent, the leg was thrown out with such violence as nearly to overturn one of the assistants, who in vain attempted to prevent its extension!

In the 2d experiment, the rod was applied to the phrenic nerve in the neck, when laborious breathing instantly commenced: the chest heaved and fell; the belly was protruded and collapsed, with the relaxing and retiring diaphragm; and it is thought, that but for the complete evacuation of the blood, pulsation might have occurred!!

In the 3d experiment, the supra-orbital nerve was touched, when

every muscle in the murderer's face 'was thrown into fearful action'. The scene was hideous - several of the spectators left the room, and one gentleman actually fainted, from terror or sickness!!

In the 4th experiment, the transmitting of the electrical power from the spinal marrow to the ulnar nerve, at the elbow, the fingers were instantly put in motion, and the agitation of the arm was so great, that the corpse seemed to point to the different spectators, some of whom thought it had come to life! Dr. Ure appears to be of opinion, that had not incisions been made in the blood vessels of the neck, and the spinal marrow been lacerated, the Criminal might have been restored to life!!!

Taken from The Medical Repository (January 1820)  
Submitted by John Johnson, Bamburgh